

Remarks/Arguments

Claims 1-18 were pending in the application and were under rejection. Claims 1-3, 10-14, 17, and 18 are amended herewith. Claims 1-18 remain in the application.

A Petition for Extension of Time Under 37 CFR 1.136(a) is submitted herewith to extend the period for response by one month to Jan. 15, 2006.

A supplemental Information Disclosure Statement is submitted herewith.

Applicant believes the Abstract to be in compliance with respect to content and length.

Regarding the objections to claims 1-18 as expressed in items 4 and 5 of the Office Action, applicant respectfully traverses the request to delete parentheses, particularly with respect to their use with reference numerals in the claims. Section 608.01(m) of the MPEP specifically permits the use of reference numbers in claims, so long as they are enclosed within parentheses. Accordingly, the parentheses remain around the reference numerals.

While applicant's attorney is not aware of the specific basis for the request to delete parentheses around abbreviations, or for the objection to the use of those abbreviations themselves, changes to the claims have been made to obviate that concern and to advance the prosecution. This is the first time in more than thirty years of practice that applicant's attorney can recall receiving an objection of this type. It is believed the claims were, and are, clear and non-ambiguous, either with or without the abbreviations. For example, the use of the abbreviation "ERD" for "energy recovery device" was simply viewed as a way to shorten the length of the claims without in any way changing the meaning. It is believed that chemical symbols are acceptable in claims, and they simply represent abbreviations of longer words. In the present instance, the notations "energy transfer device", "energy recovery device", "water transfer device" and "ERD" are viewed as being synonymous, are equated in the specification and the claims, and are used interchangeably (note page 2, lines 30,31; page 5, lines 19, 20, 30-34; page 6, lines 11,12; etc). The same is true with respect to the use of "further" and/or "supplemental" as a modifier to identify the energy recovery device/ERD 50 (note that claim 1 has been amended in lines 25 and 26 to provide consistent use of "further"). However, as noted

earlier, all abbreviations have now been deleted from the claims, which should obviate the Examiner's concern in this regard.

Attention is now turned to the rejection of the claims based on prior art, and specifically, the rejection under 35 USC 103(a) for obviousness based on "applicant's admission of prior art in view of Grasso et al (U. S. 6,274,259)". Firstly, applicant wishes to note that the Grasso patent ('259) is representative of the prior art characterized by the applicant, as will be clearly seen from the statement at page 9, lines 11-13 of the present application. It is not seen how a rejection based on "applicant's admission of prior art in view of Grasso et al (U. S. 6,274,259)" is any more than either one of those sources alone. More to the point, applicants "prior art" of Fig. 1 (and the 1st 13 lines of claim 1) is the same as the '259 reference. Applicant's "prior art" ERD 30 of Fig. 1 is the same as the device 92 in the '259 reference. They both have 2 gas channels separated by an enthalpy exchange barrier (36 in present application and 12 in the '259 reference). The '259 reference does not have the further ERD 50 required by applicant's invention. In any event, it is respectfully submitted that the present invention, as presently claimed, is not obvious in view of a combination of the "admitted" prior art and the '259 patent, as will be discussed following.

The objective of the present invention is to provide an improved arrangement/method for controlling or stabilizing the humidification or dew point of inlet air supplied to the fuel processing system of a fuel cell power plant. While the "prior art"/'259 patent do/does afford some humidification of inlet air (via the gas/gas- type heat and mass transfer device, or ERD, 30 of present Fig. 1 "prior art"/mass and heat transfer device 92 of '259 patent), which humidification may be beneficial in the oxidant supplied to the fuel cell cathode, that same air is typically also the oxidant supplied to the combustion-supported reaction means (burner and/or reactor) of the fuel processor, and the humidification of the oxidant may be excessive and undesirable there, particularly during start-up. This is fully explained in the paragraph bridging pages 4 and 5 of the specification.

The present invention overcomes this problem through the inclusion of a second, or further, or supplemental, energy recovery device (ERD), typically of the gas/liquid-type. The presence of that further ERD 50 in the present invention serves to regulate or

control, either directly or indirectly, the dew point of the oxidant stream supplied to the combustion-supported reaction means (20, 120) of the fuel processing system, to assure good combustion, even during start-up. Both the primary ERD 30 and the further ERD 50 are of a type that affords mass and heat transfer, as via a fine pore saturator medium or the like. The water temperature in the liquid channel of the further ERD 50 regulates the dew point of the gas flowing through the other channel of the further ERD 50. If the gas in the other channel of the further ERD 50 is the oxidant to the combustion-supported reaction means, as in the Fig. 3 or Fig. 5 embodiments of the invention, then the regulation of the dew point is direct. If the gas in the other channel of the further ERD 50 is from the fuel processor and/or fuel cell, as in the Fig. 4 or Fig. 6 embodiment of the invention, then the regulation of the dew point of the oxidant to the combustion-supported reaction means is indirect via the primary ERD 30. In either event, both the primary ERD 30 and the further ERD 50 are required for this regulation of combustion oxidant dew point. The '259 reference clearly does not show, describe or suggest the use of a primary ERD (gas/gas) and a further ERD (gas/liquid) in a serial connection to attain the beneficial results of the claimed invention. At most, it discloses only a gas/gas-type ERD such as the primary ERD 30 of the present invention, and thus possesses the limitations of the prior art. Nowhere does that reference discuss or suggest a need for regulation of the dew point of the oxidant to the combustion-supported reaction means (burner and/or reactor).

Although the preceding comments alone are believed to establish the patentability of the independent claims over the references, it is useful as a general matter to also address the position taken by the Examiner in the paragraph bridging pages 6 and 7 of the Office Action. The position was taken that "it has been held that rearrangement, reversal or duplication of parts is obvious". Reliance was placed on *In re Japikse*, 86 USPQ 79 (CCPA 1950). While that may apply in the simplest sense, it does not in a number of instances, and certainly does not apply in the present. The Japikse case found that the position of a starting switch was unpatentable over prior art because shifting of the position would not have modified the operation of the device. Conversely, in *Ex parte Chicago Rawhide Mfg. Co*, 223 USPQ 351 (Bd. Pat. App. & Inter. 1984), it was held that "the mere fact that a worker in the art could rearrange the parts of the reference device to

meet the claims on appeal is not by itself sufficient to support a finding of obviousness. The prior art must provide a motivation or reason for the worker in the art, without the benefit of appellant's specification, to make the necessary changes in the reference device". It is clear from the explanation above that there simply is no teaching of locating a primary ERD (gas/gas) and a further ERD (gas/liquid) in the system and serially connected in the specified manner, nor of the benefits that derive by doing so.

While it is applicant's position that the structures of independent claims 1 and 13, as well as the specifically claimed method (claim 14) of passively condensing moisture from a gas stream upstream or downstream of the primary ERD, clearly distinguish over the prior art, it is further useful to consider the additional features afforded by various dependent claims. Claim 2 is specific to the Figs. 4 and 6 embodiments (indirect regulation of dew point, but desirable reduction of enthalpy exchange barrier 36 dry out). Claim 3 is specific to the Figs. 3 and 5 embodiments (direct regulation of dew point). Claims 5 -9 specify details about the combustion supported reaction means (20, 120) and the various sources of the exhaust gas stream (28). Claims 10 and 11 provide that the further energy recovery device 50 includes an enthalpy exchange barrier, and particularly a fine pore saturator medium, for the transfer of heat and mass. Importantly, claim 12 provides that the temperature of the water to the further ERD 50 serves to regulate the dew point of the oxidant stream to the combustion supported reaction means. Independent claim 13 is similar to claim 1 and included the combined limitations of dependent claims 11 and 12. The dependent method claims 15 -18 further define the step of passively condensing moisture from a gas stream at other than the primary ERD to regulate the dew point of the supplied oxidant, with particular emphasis on the temperature of the liquid (water) being the determinant regulated.

Applicant has cited herewith two additional references, to wit, U. S. 6,007,931 ('931) to Fuller et al and U. S. 6,416,892 ('892) to Breault. The '931 reference is very similar to the '259 reference applied by the Examiner, appears to be no more relevant than that reference, and is cited merely for completeness.

The '892 reference is similar in many respects to the '259 and the 931 references, but differs in that its mass and heat transfer device 68 may be "functionally integrated with the coolant loop 48" in a manner and for the purpose described at Column 9, lines

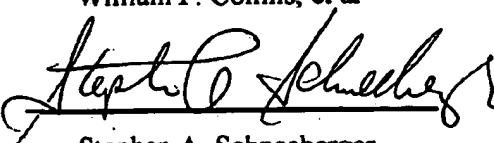
25-43 of that reference. However, nowhere does it suggest the desirability of regulating the dew point of the oxidant supplied to the burner 40, nor does it describe a system having serially connected primary and further ERDs, the primary ERD being of gas/gas-type and the further ERD being of gas/liquid-type. Neither does it suggest regulating the temperature of the liquid (water) to directly or indirectly regulate the burner oxidant dew point for enhanced start-up operation. At Column 15, lines 32-38 of the '892 reference, there is brief and vague mention of possibly using a plurality of mass and heat transfer devices 68, or at least multiple enthalpy exchange devices 12, "secured in a manner appropriate to efficiently transfer water and heat from the plant exhaust to the process oxidant stream, depending upon the requirements of the of the plant 10". While it is the hind sight knowledge afforded by the present invention that prompts applicant to cite this reference in the interest of completeness and candor, it is respectfully submitted that the reasonable teachings of that reference simply do not disclose or suggest the present invention. In all likelihood, the suggestion of multiple devices is for the purpose of scaling that feature to the size of a particular plant, with multiple such devices being used for larger plants. Although that reference provides device 68 for a gas/gas-type mass and heat transfer "from the plant exhaust to the process oxidant stream", nowhere does it consider the use of a further gas/liquid energy recovery device serially connected with the primary (gas/gas) for the purpose of regulating the dew point of process oxidant specifically for the burner. Still further, there is no suggestion that such end is, or may be, accomplished through the regulation of the water temperature flowing through the liquid channel of a further (gas/liquid) ERD.

Accordingly, it is respectfully submitted that the claims, as now amended and in view of the preceding comments, clearly and patentably distinguish over any appropriate combination of teachings contained in the references cited herein. Entry of this amendment, and favorable reconsideration and an indication of allowance are respectfully requested. In the event issues remain and the Examiner feels the prosecution might be advanced by further discussion, the Examiner is respectfully requested to contact applicant's attorney at the number below.

Respectfully submitted,

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By:

A handwritten signature in cursive script, appearing to read "Stephen A. Schneeberger", written over a horizontal line.

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